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AUTHOR Hill, Nancy C.; And Others
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ABSTRACT

The study investigated three variables--juvenile delinquency, academic achievement, and attention span--with 77 incarcerated juveniles [18 emotionally handicapped (EH), 20 learning disabled (LD), 19 educable mentally retarded (EMR), and 20 nonidentified]. The Detroit Tests of Learning Aptitude were used for testing in the areas of visual and auditory attention span. Although no direct cause-effect relationships were identified by the investigation, some trends were identified and support was found for attention span as a critical variable in learning. One phenomenon evident in the study was a lack of significant differences between the LD and nonidentified groups on the reported measures of attention span. Even though all groups had means below the norm expected for their chronological ages, the EH and EMR students were nearer in mental ages on these measures. The factor which differentiated these two groups was academic achievement, with the EH students scoring higher. Since the LD and nonidentified groups were more nearly alike, it was inferred that no instructional adaptations are necessary for incarcerated LD students or that educational adaptations made for LD students would be equally effective in teaching nonhandicapped incarcerated juveniles. (SBH)

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ATTENDING BEHAVIOR: COMMONALITIES AND DIFFERENCES AMONG EDUCABLE RETARDED LEARNING DISABLED, AND EMOTIONALLY HANDICAPPED JUVENILE DELINQUENTS

Submitted to: The CEC National Conference On
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Submitted by: Nancy C. Hill, Ph.D.
Program for Exceptional Children
University of South Carolina

Linda G. Parker, Ph.D.
Program for Exceptional Childrne
University of South Carolina

Ann Corbett, M.Ed.
Program for Exceptional Children
University of South Carolina

Karen L. Miano, M.Ed.
Program for Exceptional Children
University of South Carolina

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INTRODUCTION

Authorities in education, medicine, law enforcement, justice and juvenile corrections continue to collect evidence that indicates a correlation between academic underachievement and juvenile delinquent behavior patterns. This evidence also suggests that individuals with learning problems run the risk of delinquency and crime to achieve what they failed to achieve in school (Comptroller General, 1977). These learning problems may be identified as learning disabilities, reading retardation, emotional disturbance, mental retardation or environmental disadvantage. Today's delinquent has an average age of 13.5 years, an average intelligence quotient of 95 and has a discrepancy of two to four years between achievement potential and actual achievement.

Attention and memory are two variables that are closely associated with learning and concommitant academic achievement or academic underachievement. In the early 1900's, attention was a major concern of psychologist. However, it was the late 1940's before Hebb (1947) scolded psychologists "... for their failure to pay due respect to attention." Berlyne (1951) stated that attention appears in terms of behavior, as selectivity. Research in the seventies has explored attending behaviors and especially attention span. The research of Sherfey (1976), Samuels (1971) and Blackwell (1978) is just a small sample of the research related to attention span.

It is to these three variables that this paper is concerned; 1) juvenile delinquency, 2) academic achievement and 3) attention span. Within the investigation the authors will look at the delinquent population as a whole and in terms of special education classifications

that include educable mental retardation, emotional handicaps and learning disabilities.

The authors subscribe to the multiple causal theory in terms of academic underachievement, therefore, attention span, in this study, is not investigated as a single causal factor. The study is an initial explanation of one aspect of a never ending cycle of academic failure and juvenile delinquency.

Statement of the Problem

Results from three factor analytic studies indicated that three of the subtests from the Detroit Tests of Learning Aptitude - "Visual Attention Span for Objects", "Auditory Attention Span for Related Syllables", and "Auditory Attention Span for Unrelated Words," measure memory (Berlyne, 1951). If the Detroit Tests of Learning Aptitude (DTLA) truly measures attention span, then the result of our study will determine whether or not the identified population as a group will score lower than the non-identified population. It will also determine whether members of a specific identified population have further depressed scores due to their emotional, mental or learning deficits.

Research Questions

It was the purpose of this study to attempt the followng comparisons:

1) Will an overall comparison among four adolescent incarcerated population; emotionally handicapped (EH), learning disabled (LD), educable mentally retarded (EMR) and non-identified, and the four test measures; Auditory Attention Span for Unrelated Words, Visual Attention Span for Objects, Auditory Attention Span for Related Syllables and Visual Attention Span for Letters provide evidence that attention span is significantly different?

2) Will a comparison between the three identified incarcerated populations as a group (EH, LD & EMR) and the non-identified population on all four measures provide evidence that attention span is significantly different?

3) Will a comparison among the three identified incarcerated populations (EH, LD & EMR) on all four measures provide evidence that attention span is significantly different?

4) Will a comparison between each individual identified incarcerated population (EH, LD & EMR) and the non-identified population on all four measures provide evidence that attention span is significantly different?

REVIEW OF THE LITERATURE

Academic Achievement and Juvenile Delinquency

The relationship between academic achievement and other factors such as intelligence, social class, residential area, personality and juvenile delinquency have been studied increasingly in recent years (Conger, Miller & Walsmith, 1975). However, a cause-and-effect relationship has not been clearly established. The following studies deal with the suspected link between academic achievement and juvenile delinquency.

In a study conducted by Bachara and Zaba (1978) the effectiveness of appropriate academic therapy was related to recidivism rate in juvenile offenders. Primary attention was directed toward the juvenile offender's particular learning problem. Students were divided into two groups. Group A received no academic therapy and Grout B received academic therapy. The results suggested a significant decline in recidivism for the students who received academic therapy. Although Bachara and Xaba received positive results, they stated that further

studies should be conducted. Fakouri (1979) compared the academic profiles of delinquent and non-delinquent subjects. The results indicated a relationship between school achievement and delinquency, but no attempt was made to establish a causal relationship between the two factors.

Academic underachievement, especially in the area of reading, has been associated with delinquent behaviors in children (Zinkus & Gottlieb, 1979). The reading problems appeared to result from perceptual disturbances. Lerner (1971) suggested that visual and auditory perceptual deficits could severely impair academic performance. Visual-perceptual deficits also have been associated with neuorlogically impaired children who exhibited antisocial behavioral disorders (Zinkus & Gottlieb, 1979). Berman (1974) reported that 30% of delinquent subjects manifested disturbances in auditory discrimination or auditory sequential memory.

Attention Span

Deficiencies in attention span may impede learning generally and reading in particular (Bond, 1935; Harris, 1949; Monroe, 1937; Rizzo, 1939; Robinson, 1946; Saunders, 1931). Betts (1945) and Stauffer (1947) listed five characteristics of severely retarded readers. The characteristics listed were as follows.

1) Visual span for nonverbal stimuli was superior to auditory span for verbal stimuli.
2) Auditory span for related stimuli was superior to auditory span for unrelated stimuli.
3) Visual span for nonverbal stimuli was superior to visual span for verbal stimuli.
4) The ability to repeat digits forward was superior to the ability to repeat digits backwards.

5) A relatively short auditory span existed for verbal material represented arithmetically.

Sandstedt (1964), in a study concerning memory span and its relationship to intelligence in severely retarded readers, studied subjects with a grade range from second grade through seventh grade. Chronological age ranged from eight to 13 with a mean age of ten years and two months. Reading disabilities ranged from two years to seven years with a mean disability of three years. Thirty-eight of the 45 subjects were male and seven were female. All of the subjects in the study were given all four memory span tests found in the DTLA and the Wechsler Intelligence Scale for Children (WISC). Results from the study indicated that there was no signigicant difference between the Performance (nonverbal) and the Verbal Scales of the WISC. Correlation coefficients were as follows:

1) DTLA total memory span IQ and Full Scale WISC IQ was .698;
2) DTLA total memory span IQ and WISC Performance IQ was .660;
3) DTLA total memory span IQ and WISC Verbal IQ was .581;
4) DTLA Auditory attention span for Unrelated Words and the WISC Full Scale IQ was .580;
5) Total memory span for the other three tests on the DTLA and the WISC Full Scale IQ was .356.

Conclusions from these data suggested that the retarded readers studied performed equally well on the Performance Scale and Verbal Scale of the WISC. These results supported the findings of Altus (1956). Results from the Sandstedt study also indicated that the retarded readers were more successful with the Visual Test of Unrelated Objects (nonverbal) than the Auditory Test of Unrelated Words (verbal). These results substantiated the earlier work of Stauffer (1947). Sandstedt concluded

from the results of this study that "....The general tendency to achieve higher scores on a total visual memory span as compared with total auditory span might be indicative of aural difficulty with verbal materials rather than be indicative of a deficient auditory memory span per se" (p. 249).

In a study designed to measure the relationship between visual sequential memory and reading in normal and disabled readers, the Gray Oral Reading Test correlated .51 with the Benton Visual Retention Test. The Gray Oral Reading Test correlated .47 with the Illinois Test of Psycholinguistic Abilities' visual and auditory sequential memory subtests. Results indicated that subjects who performed well on the Gray Oral Reading Test also performed well on measures of visual memory. Both visual memory and reading correlated positively with age (Guthrie, 1972).

Whimbey and Fischhor (1969) gave 24 subjects a digit span test and 40 subjects a mental addition test. The items on the mental addition test were presented by tape recorder and the subjects were required to remember two lines of numbers and to add the numbers mentally. Results suggested that the ability measured by a digit span test may be important in any task requiring information storage for a brief period of time while other information is being received and processed. The authors stated that a span test may measure an important intellectual ability in spite of the fact that digit span and other learning measures have not been found to correlate highly.

METHODS AND PROCEDURES

This section will discuss the specific procedures used, the subjects, and the data reporting techniques that were employed in the research.

Population

Subjects for the study were selected from the institution for incarcerated juveniles in South Carolina. This institution is located in Columbia, South Carolina and houses approximately 750 students ages 11 through 17, with most students' ages being 14 and over. The sample included sixty-eight males and nine females with a mean chronological age of 15 years 4 months. If at the time of initial evaluation for the juvenile justice system students were suspected of being handicapped, they were referred to the school psychologist. A specified battery of tests required by the South Carolina Department of Education were administered in order to label a student as EH, LD or EMR. Students who had been identified as EH, LD or EMR by the school psychologist were placed in a pool of other subjects with the same handicapping condition. Twenty subjects were randomly selected from each classification (EH, LD & EMR). Twenty subjects were then randomly selected from the non-identified population. Some of the subjects were released by the Department of Youth Services prior to testing, therefore, the final sample consisted of 77 instead of 80 subjects (18 EH, 20 LD, 19 EMR & 20 non-identified).

Procedures

The DTLA was used for testing in the areas of visual and auditory attention span. Four subtests were administered; 1) subtest #6 - Auditory Attention Span for Unrelated Words (AASUW), 2) subtest #9 - Visual Attention Span for Objects (VASO), 3) subtest #13 - Auditory Attention Span for Related Syllables (ASSRS), and 4) subtest #16 - Visual Attention Span for Letters (VASL).

The DTLA (Harry Baker and Bernice Leland, 1967) may be used from

preschool through high school. The battery yields a general mental age and a series of subtest mental ages. It was first published in 1935 and revised in 1959. In 1967 the DTLA Examiner's Handbook was revised. The tests were not changed.

The four subtests were administered by trained clinicians from the University of South Carolina. The four subtests were administered to each student individually. The testing was conducted during a six-week period.

METHODS OF STATISTICAL ANALYSIS

Each subtest raw score was converted to a mental age using the tables provided in the test manual. Both chronological age and the mental age were converted into months. Variables were population (EH, LE, EMR & non-identified), race, chronological age and mental age. A two way analysis of variance was conducted in order to answer the four research questions. A Statistical Analysis System (SAS) was used as the computer program for analyzing the data.

There are three advantages for using an analysis of variance (McNemar, 1969).

1) When large or small samples are involved, it can provide an overall test of the significance of the difference between two or more means.
2) It can improve the estimate of the sampling error when double or triple or higher-order classification is involved.
3) It also provides a means of testing whether the influence of one independent variable on the dependent variable is similar for subgroups formed on the basis of a second independent variable.

RESULTS

Race, sex and chronological age were not significantly different between groups, therefore, these variables are not reported in this study.

Research Question One

Will an overall comparison among four adolescent incarcerated populations (EH, LD, EMR & non-identified) and the four test measures (AASUW, VASO, AASRS & VASL) provide evidence that attention span is significantly different?

Table I

SOURCE	DF	SS	MS	F	PR F	MS in Y-M
subtest #6						
AASUW	3	21150,079	100.091	6.34	.0008	8 - 3
subtest #9						
VASO	3	12799.186	138.740	5.65	.0017	11 - 6
subtest #13						
AASRS	3	17266.314	101.571	5.87	.0014	8 - 6
subtest #16						
VASL	3	5104.338	120.829	3.49	.0202	10 - 0

Evidence suggests that attending behaviors effect achievement levels of the students (Sandstedt, 1964). The analysis of variance was conducted to determine if there was a difference among the various groups (EH, LD EMR & non-identified) on measures of auditory short term memory and visual short term memory. Table I indicates that there was a significant difference among groups on each auditory measure (AASUW F=6.34, df=3, p .0008 and AASRS F=5.87, df=3, p .0014). In addition, there was also a significant difference among groups on each visual measure (VASO F=5.65, df=3, p .0017 and VASL F=3.49, df=3, p .0202). Each analysis involved a

4x4 experimental design with 4 groups (EH, LD, EMR & non-identified handicapped) and 4 measures of attention (AASUW, AASRS, VASO & VASL).

All measures among groups were significant. The mean age for auditory measures was consistently lower for the incarcerated juveniles in the study than were the visual measures. The analysis of variance for the among group scores reflects that these incarcerated juveniles retained the materials presented via the visual modality better than the materials presented by the auditory modality.

Research Question Two

Will a comparison between the three identified incarcerated populations as a group (EH, LD & EMR) and the non-identified population on all four measures provide evidence that attention span is significantly different?

Table II

SOURCE	DF	SS	MS	F	PF F
subtest #6					
AASUW	1	15472.618	100.091	13.54	.0004
subtest #9					
VASO	1	7762.567	138.740	9.08	.0036
subtest #13					
AASRS	1	9320.411	101.571	8.88	.0039
subtest #16	1	5047.504	120.829	10.51	.0018

Table II indicates when comparing the total group of identified handicapped incarcerated juveniles (EH, LD & EMR) with their non-identified handicapped incarcerated peers that auditory measures were significant at less than the .01 level (AASUW F=13.54, df=1, p .0004 and AASRS F=8.88, df=1, p .0039). Visual measures were also significant at less than the .01 level (VASO F=9.08, df=1, p .0036 and VASL F=10.51,

df=1, p .0018). Again, materials presented via the visual modality were retained better than the materials presented by the auditory modality.

Research Question Three

Will a comparison among the three identified incarcerated populations (EH, LE & EMR) on all four measures provide evidence that attention span is significantly different?

Table III

SOURCE	DF	SS	MS	F	PR F
subtest #6					
AASUW	2	6306.206	92.421	3.03	.0571
subtest #9					
VASO	2	5946.472	133.000	3.70	.0316
subtest #13					
AASRS	2	8413.901	95.632	4.85	.0118
subtest #16					
VASL	2	761.209	116.411	0.90	.4116

When comparing the scores on each subtest between only the identified handicapped students (EH, LD & EMR) only two measures were significant. One auditory measure was significant at the .01 level (AASRS F=4.84, df=2, p .0118) while one visual measure was significant at less than the .05 level (VASO f=3.7, df=2, p .0316). The remaining auditory measure (AASUW) approached signigicance at the .05 level (F=3.03, df=2, p .0571). The remaining visual measure (VASL) was not significant (F=.90, df=2, p .4116). Auditory measures continue to be more signigicantly different than visual measures within the handicapped group.

Research Question Four

Will a comparison between each individual identified incarcerated population (EH, LD & EMR) and the non-identified population on all four measures provide evidence that attention span is significantly different?

Table IV

	SOURCE	DF	SS	MS	F	PR F	MS in Y-M
	subtest #6						
	AASUW	1	15694.137	103.462	13.28	.0009	8 - 7
	subtest #9						
EMR to Non-ID	VASO	1	7453.891	142.538	8.35	.0066	11 - 10
	subtest #13						
	AASRS	1	13434.664	102.385	13.47	.0008	8 - 6
	subtest #16						
	VASL	1	4382.486	122.231	8.93	.0051	10 - 1
	subtest #6						
	AASUW	1	14062.277	105.079	12.17	.0014	8 - 9
	subtest #9						
EH to Non-ID	VASO	1	10374.876	139.816	13.22	.0009	11 - 8
	subtest #13						
	AASRS	1	8430.642	105.237	6.69	.0141	8 - 9
	subtest #16						
	AASUW	1	2954.466	125.921	4.73	.0367	10 - 6
	subtest #9						
LD to Non-ID	VASO	1	1099.584	150.375	1.38	.2477	12 - 6
	subtest #13						
	AASRS	1	1086.497	114.225	1.06	.3099	9 - 6
	subtest #16						
	VASL	1	1850.101	127.154	3.27	.0790	10 - 7

In Table IV the results of the comparisons of each identified handicapped group with the non-handicapped group are listed. The auditory measures for the EMR group (AASUW F=13.28, p .0009 and AASRS F-13.47, p .0008) were significantly lower than auditory measures for the non-identified group. The difference between auditory measures for the EMR group as compaired to the non-identified group was significant at less than the .001 level. The difference between the visual measures for the two groups (VASO F=8.35, p .0066 and VASL F=8.93, p .0051) was significant at the .01 level.

The difference between the auditory measures of the EH group when compared to the non-identified group (AASUW F-12.17, p .0014 and AASRS F=6.69, p .0141) was significant at the .01 level. The visual measures also yielded a difference which was significant at less than the .05 level (VASO F=13.22, p .0009 and VASL F=4.73, p .0367).

When the LD group was compared to the non-identified group, there was no significant difference between the groups on any measure (AASUW F=3.08, p .0878; AASRS F=1.06, p .3099; VASO F=1.38, p .2477 and VASL F=3.27, p .0790). Two measures, however, AASUW and VASL, do approach significance with p=.0878 and p=.0790 respectively.

All auditory and visual measures resulted in mean mental ages significantly below the norms for the DTLA. Table I includes the mean mental age scores across all groups. The mean chronological age among all groups was 15 years 4 months. The mean mental age for the entire sample based on the 4 subtests investigated was 9 years 7 months. Table I and Table IV show mean ages for the mental age computed based on the subtests administered. Table IV lists the mean mental age of the two auditory and two visual measures for EMR and non-identified group, EH and non-identified group, and LD and non-identified group. All mental ages based on the subtest measures included in this study were significantly lower than the mean chronological age of the subjects. These mental ages derived from 4 DTLA subtests ranged from 8 years 6 months to 12 years 6 months while the mean chronological age was 15 years 4 months.

DISCUSSION

This study, which addressed the issue of attention span as it relates to juvenile offenders, supports previous findings that attention span, academic achievement, handicapping conditions and juvenile delinquency are interlated (Lerner, 1971; Zinkus & Gottlieb, 1979; Berman, 1974; Betts, 1945 and Stauffer, 1947). No direct cause-effect relationships were identified by this investigation, but some trends were identified. In addition, these findings lend support to previous evidence that attention span is a critical variable in learning.

One phenomenon evident in the study was there was not significant difference between the LD and non identified groups on the reported measures of attention span. All subjects in the study were three or more years below grade expectancy on achievement tests. Other variables such as previous IQ tests suggested the LD and non-identified students had the potential for near chronological age expected achievement levels.

Even though all groups had means below the norm expected for ages, the EH and EMR students were nearer in mental ages on these measures. The factor which differentiates these two groups is academic achievement, with the EH students scoring higher achievement scores (Hill, 1980). Since the LD and the non-identified groups were more nearly alike, one could infer that no instructional adaptations are necessary for incarcerated LD students or that educational adaptations made for LD students would be equally effective in teaching non-handicapped incarcerated juveniles.

Since all visual measures were higher than all auditory measures among all groups, an abbreviated listing of visual stimuli which would be useful in augmenting traditional content-ladened lectures are listed:

1) Charts
2) transparencies
3) posters
4) lecture notes for students
5) printed lecture outlines
6) printed discussion questions with a list of alternative answers
7) instructional bulletin boards prepared by students
8) microcomputers, calculators, electronic word devices
9) captioned film strips
10) movies
11) maps
12) globes
13) mobiles
14) matrix
15) printed or drawn directions
16) role playing
17) dramatizations
18) models
19) graphs
20) simulators

Such a list is never exhaustive but is included to spur the creative, imaginative practitioner.

In conclusion, it is possible to identify the handicapped population who are incarcerated based on auditory and visual measures. Such testing may also lead to more refined methods for separating the various classifications of handicaps for the purpose of label and instruction. It should be remembered that the issue of the relationship between attention span and learning has not been resolved.

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